

Pneumatic Sheet Metal Cutting Attachment

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Abstract - The objective of the project is to prepare a machine which cuts sheet metal without human efforts but operates pneumatically. Compressed air is used as working media. The compressed air moves the blades of machine to cut the sheet of metal. The idea of the project generated due to a manual sheet metal sheering machine in Shree Ganesh Industry. In that machine sheet metal is placed in between the two sheering blades of machine and the lever is pulled down to move the upper movable blade and cut the work piece. But in that machine large force is required between (30-40 kg) which can make tire to a worker who continuously works on it for mass production in large scale industry; so to reduce the human efforts pneumatic machine should chose. Hence for some development of machine, we have chosen this subject for our project. We hope that a good idea will develop and we can use it in many industries in surrounding and our practical knowledge, team working skill, leadership skills will be improved

1. INTRODUCTION

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1.1 Aim of Project:

Cuts sheet metal without human efforts, convert manual machine to semi-automatic machine.

1.2 Description of Project:

The objective of the project is to prepare a machine which cuts sheet metal without human efforts but operates pneumatically. Compressed air is used as working media. The compressed air moves the blades of machine to cut the sheet of metal. The idea of the project generated due to a manual sheet metal sheering machine in Shree Ganesh Industry. In that machine sheet metal is placed in between the two sheering blades of machine and the lever is pulled down to move the upper movable blade and cut the work-piece. But in that machine large force is required between (30- 40 KG)which can make tire to a worker who

continuously works on it for mass production in large scale industry; so to reduce the human efforts pneumatic machine should chose. Hence for some development of machine, we have chosen this subject for our project. We hope that a good idea will develop and we can use it in many industries in surrounding and our practical knowledge, team-working skill, leadership skills will be improved.

2. METHYODOLOGY

DC valve is at left hand position as shown in figure. The cap end port & pressure port get connected to each other and the rod end port gets connected to the exhaust port. The compressed air comes in the cap end of the cylinder and pushes the pistons outwards. The air already present in the rod end side is pushed out of the cylinder.

2.1 Problem Statement:

It is difficult for a worker to use force on a machine and do the same thing a long time. To solve this problem, the foot operated machine was converted pneumatically operated. Manual cutting machines are not suitable for bulk cutting processes with accuracy.

2.2 Objectives:

- To prepare a machine which cuts sheets metal without human efforts but operates pneumatically.
- Mass production techniques can be adopted to produce pneumatic system, which not only save money but save time too.
- The air is used in pneumatic devices is dried and free from moisture so that it does not create any problem to the internal parts of the system.
- As most of the pneumatic devices are air based, they have a less complicated design.
- Pneumatic actuators also have long life and perform well with negligible maintenance requirement throughout their life cycle.

2.3 Block diagram:

The pneumatic machine includes a table with support arms to hold the sheet, stops or guides to secure the sheet, upper and lower straight - edge blades, a gauging device to precisely position the sheet. The table also includes the two-way directional valve. The two-way directional valve is connected to the compressor. The compressor has a piston for a movable member. The piston is connected to a crankshaft,

which is in turn connected to a prime mover (electric motor, internal combustion engine). At inlet and outlet ports, valves allow air to enter and exit the chamber. When the compressor is switched ON, the compressed air is flow to inlet of the pneumatic cylinder. The sheet is placed between the upper and the lower blade. The lower blade remains stationary while the upper blade is forced downward. The upper blade is slightly offset from the lower blade, approximately 5–10% of the sheet thickness. Also, the upper blade is usually angled so that the cut progresses from one end to the other, thus reducing the required force. After the material is cut, adjust the pneumatic hand lever to the mid position (i.e., normal position) and then the compressor is switched OFF. The following figure shows general layout for the machine.

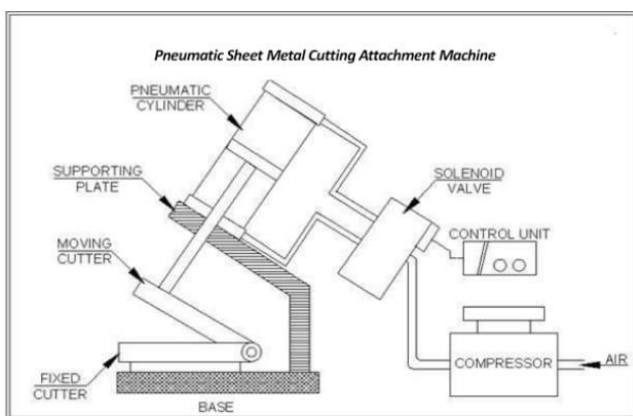


Fig -1: Pneumatic Sheet Metal Cutting Attachment Machine

Through FRL unit air can be controlled. From the manifold a separate supply for the machine is taken out and given to initially the air-compressor is started and allowed the receiver tank air pressure to reach up to 8 bars. The supply air is then passed to the manifold ON/OFF switch; so as to operate the machine at will without interrupting the running of compressor. Then the pipe carries compressed air first to machines Direction Control Valve. At position „A“ shows the non-actuated circuit diagrams. At this position the piston is steady and locked. All ports are in closed condition at position „B“, the DC valve is at left hand position as shown in figure. The cap end port & pressure port get connected to each other and the rod end port gets connected to the exhaust port. The compressed air comes in the cap end of the cylinder and pushes the pistons outwards.

3. CONCLUSIONS

Now we know that Pneumatic sheet metal cutting attachment machine is very cheap as compared to hydraulic shearing machine. The range of the cutting thickness can be increased by arranging a high pressure compressor and this machine is advantageous to small sheet metal cutting industries as they do not have to rely on the expensive hydraulic shearing machine. By using this machine production time is decreased and gets accurate by product also this machine when in working that time no need of worker continue for operating to this machine

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BIOGRAPHIES



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